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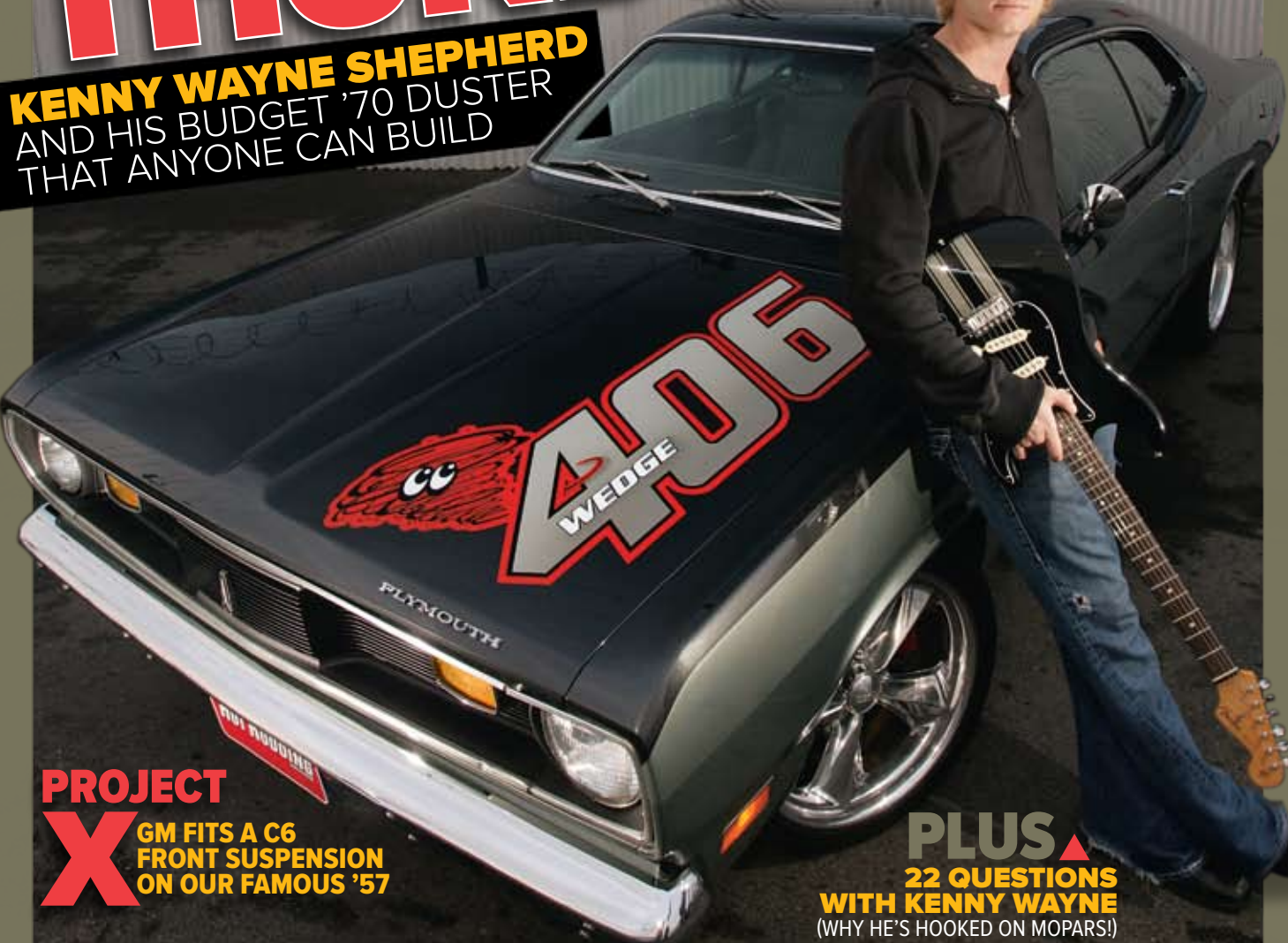
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PHR PROJECT CAR

## PROJECT X



# UP FRONT

**America's most famous '57 Chevy gets a C6 Corvette front suspension**

**By William Harvey • Photography by Chuck Cloud**

In our January 2008 issue we outlined how Project X was going home to General Motors after 50 years of service. Not only were we looking to sample the latest in crate engine technology from GM Performance Parts, but the vehicle integration geniuses at GM Performance Division (GMPD) had also offered to upgrade their old friend to a modern Pro Street cruiser. Who were we to say no?

For many reasons, when you look at the car's overall function, you start at the frame and build out. It seems obvious, but the frame is the foundation of

the car that dictates the dynamics for all movements or performance levels. In the case of the '57 Chevy, the vehicle offers the classic peripheral-frame GM architecture that not only made these cars strong to begin with, but also has allowed them to withstand the test of time with quite a bit of grace. This is especially important for a car like Project X that has seen a lot of use and hundreds of dragstrip passes.

It is because of this logic that the technicians at GMPD started the latest transformation of Project X with a complete disassembly—all the way to

the frame. The plan called for melding a 50-year-old chassis with the cutting-edge design of today's Chevy Corvette. To do that, GMPD scanned Project X's entire frame, then designed a strategy to incorporate a C6 frontend. In a modern GM production vehicle, the math data for every piece of the car is safely locked away somewhere in a GM computer. If you want to know how many hose clamps, wire ties, or millimeters of, well, anything, it exists somewhere in math data at GM. These huge data files allow all sorts of manipulations and final adjustments during the development



It's disassembly day at the GM Tech Center in Warren, MI, and Mike Copeland, Kevin Schultz, Mario Orlando, and Mike Hair are hard at it. Before Project X could be brought back to life after a trip to the factory, it had to be pulled apart. The GMPD techs carefully separated the body from the chassis. The crew was quite impressed with how well the 50-year-old car was preserved. While it's been driven hard, Project X has spent most of its life in dry, sunny California.

and production phase of an automobile. As we said, these files exist for modern cars, but only a few faded blueprints of the original '57 Chevy designs remain. What to do? No problem, the GMPD technicians simply scanned the entire Project X frame, and in the process generated what we believe is the first complete math file that details every single aspect of the '57 Chevy frame.

Once the Project X frame was in math, the technicians simply took the math file for a current production C6 Corvette and worked out how and where to make the two work together. In the end, our beloved Project X would enjoy all the benefits of the latest Chevy technology grafted into the existing frame.

Like all things at GM, 50 years of engineering has taught them a lot about suspensions. The stock '57 suspension consisted of a traditional coilover and a straight A-arm arrangement with ball joints and tie rod ends. It was functional, but it was sloppy at best and slow to

react to driver input. Original owners complained of a lack of feel on the road with a very heavy feel during steering input that was only compounded by lots of body roll. For the most part, the car's weight drove the steering input with no self-centering. Compare that to the vehicles GM puts out today. Great driver feedback, vehicle self-centering, and

instant response are all standard equipment. Add that to the superior materials and construction processes of today's GM, and the proposed modifications are an entire transformation.

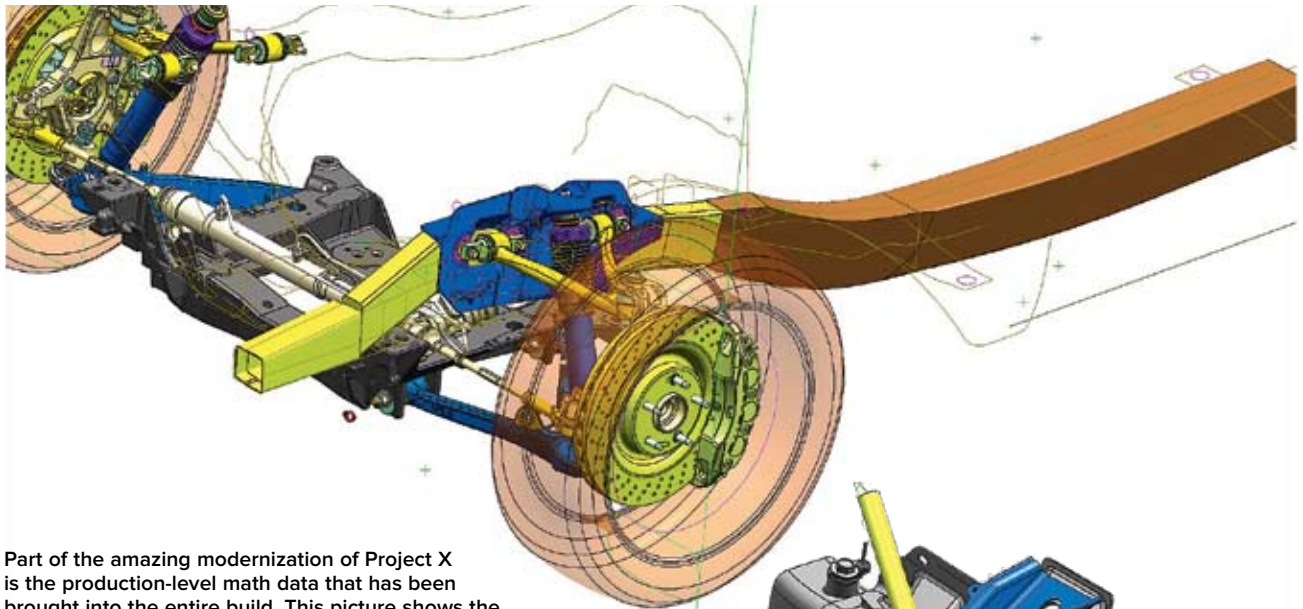
One interesting benefit of putting Project X's frame through GM's math data programs is that it allowed the GMPD engineers to run a design failure mode effectiveness analysis. This process allowed them to determine if there are any weak points in the frame by loading it with stress beyond what you would see on the road or track. In the stock '57 frame, the engineers identified areas for improvement at several points. This allowed them to plan additional materials or reinforcements for those locations. Also, previous studies found that a traditional butt-weld frame connection could be a weak area. Therefore, the team has adopted the reinforced plate method for connecting two frames.

We also need to mention that the Anniversary 427 big-block prototype engine we'll be installing in Project X is roughly the same mass as the LS3 for which the Corvette cradle was designed. The pictures that follow will detail the steps in modifying the front suspension, and in a future issue we'll detail the rear suspension and what it takes to harness 480 horsepower of big-block Chevy. **PHR**

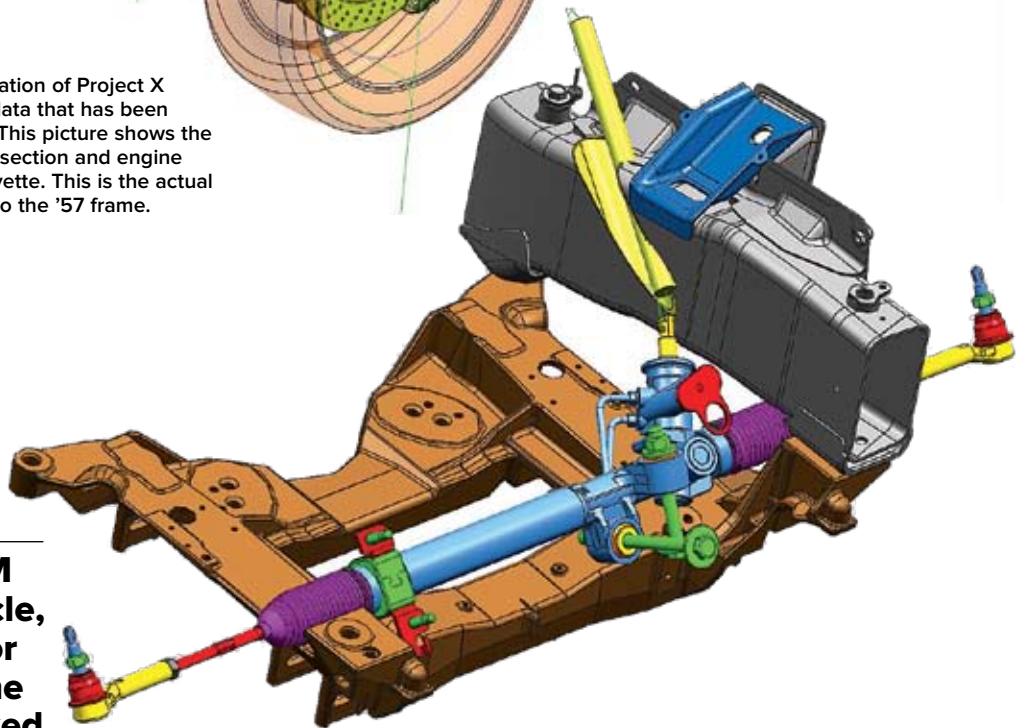


**“It seems obvious, but the frame is the foundation of the car that dictates the dynamics for all movements or performance levels.”**

Here, the frame has been separated from the body, and the team is positioning the priceless '57 frame on one of dozens of surface plates in the tech center. The surface plate offers a perfectly flat surface with grooves for bolting/anchoring with portage equipment that allows for complete digital measuring. The shot here was taken during the early stages of setup to scan the frame. Each point above the surface plate area is defined by an X (front to back), Y (side to side), and Z (height from the floor) location. Given those three dimensions, the XYZ number can define any point on the object on the surface plate. This also allows the team a reference point for assembling any structure—including a very special '57 Chevy.



Part of the amazing modernization of Project X is the production-level math data that has been brought into the entire build. This picture shows the math data for the front frame section and engine cradle from a production Corvette. This is the actual section that will be spliced into the '57 frame.



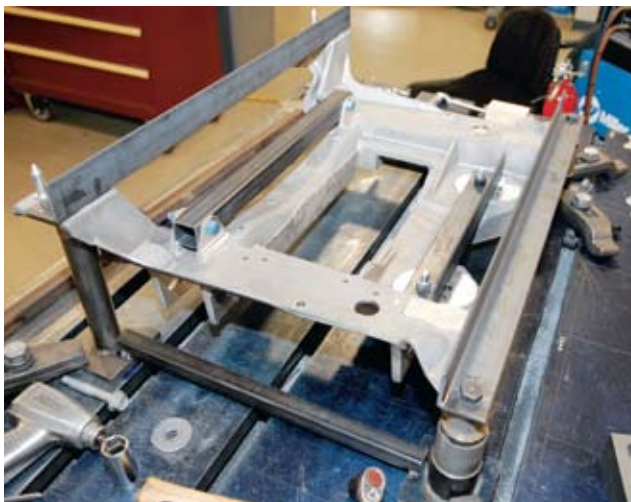
**“In a modern GM production vehicle, the math data for every piece of the car is safely locked away somewhere in a GM computer.”**



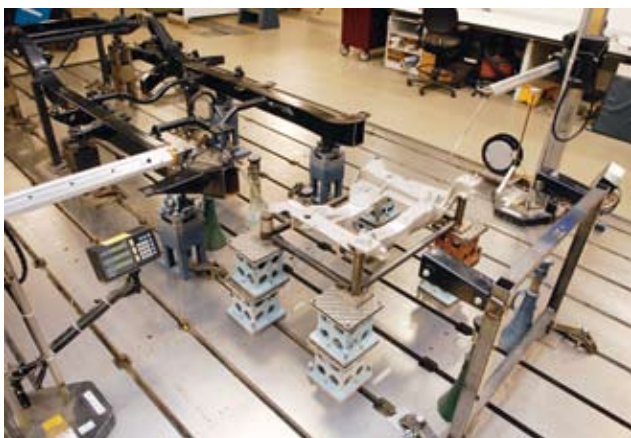
Here's a close look at one of the pieces of the special fixture used to hold the Corvette cradle in position while it was cut, resized, and welded. You can see it in position in the following picture.



Darren White begins transforming the current production Corvette cradle for use in Project X. The technicians designed a special fixture to support the Corvette cradle during the process. The math data dictated that the cradle be cut, narrowed 130mm, and TIG welded into position. Because the cradle is aluminum, special care (and support) was taken to ensure the heat from the welding process didn't warp the piece.



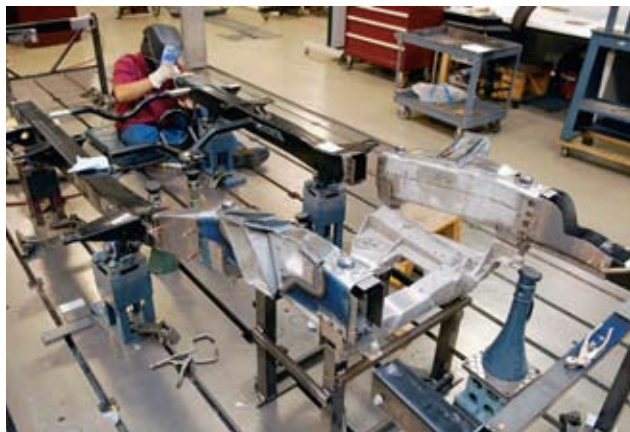
Here's another shot of the Corvette cradle in the fixture. Note the extensive bracing to make sure there is no distortion. Also note the production Corvette steering gear mounts.



Once the modifications were completed on the Corvette cradle, the team placed it into position. This shot shows the completed cradle in the exact location as mapped out a few pictures back. Again, the XYZ numbers allow for exact location on the surface plate.



The stock Corvette framerrails have been cut and will be grafted with the '57 frame. Here, you can see the roll welds on the Corvette frame with mounting plates. Four-inch plates extend 2 inches into each side of the frame.



The Corvette framerrail was then connected to the modified '57 frame. In all, they cut about 2 1/2 feet out of the original Project X. In the front, you can see the 1/8-inch steel plate (4 inches wide) allowing for a 2-inch overlap on the '57 and the Corvette. The back of the frame has been cut, and the rear frame is being narrowed 5 inches—you'll see more on that next month. Only the original frame's center section remains. The surface plate allows for assembly of this real-life frame jigsaw.



Here's the forward section of the framerrail. The Corvette frame is taller, and therefore had to step down to the '57 frame in the front so the bumper could be bolted to the car.



Tom Sefried joins in the fun as the team nears the completion of the front frame modifications. At this point, final welding has taken place, and all the component pieces are being welded together. Just study this shot for a moment and appreciate all the hand work and fabrication—and we're just looking at the front of the frame.



**“GMPD technicians simply scanned the entire Project X frame, and in the process generated what we believe is the first complete math file that details every single aspect of the '57 Chevy frame.”**

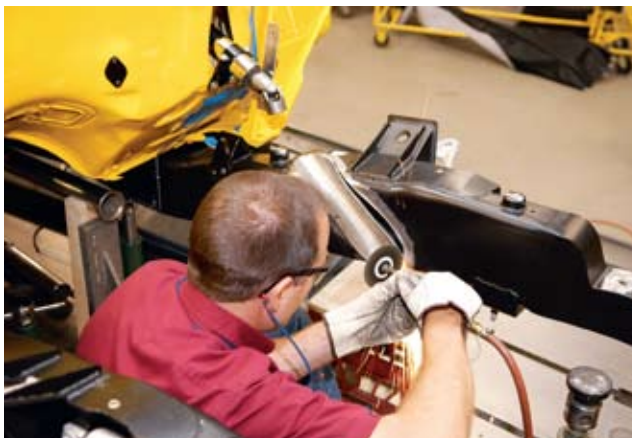
With the cutting, finishing, and welding completed, the team now moves to prepping the metal for paintwork. Mario and Tom work the grinders to smooth the welds.



The finished frame sits in front of Project X's body as it rests on a donor '57 frame. Again, you'll see full details on the four-linked narrow rear suspension next time.

Darren gives a mid-project tour to *Popular Hot Rodding* ad honchos John Barkley (left) and Bruce Miller (far right). You can see the front Corvette suspension has been installed with production C6 brakes, and the Ram Jet 502 is filling in for the Anniversary 427 big-block that we detailed back in our January 2008 issue.





Darren cuts the frame to get clearance for the steering shaft. During the initial computerized study of the '57 frame, GM engineers located weak points in the upper shock mount, which occur when coilover shocks are used instead of a transverse leaf spring to support the front of the car. You can see that more reinforcement was added to this area to ensure Project X has extra support in this weak area.



Here's the final installed shot of the steering shaft. It connects the steering column to the steering gear. Note the cleared frame, which you can see in the computer-generated math data earlier in the story.

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**“... they simply took the math file for a current production C6 Corvette and worked out how and where to make the two work together.”**

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**SOURCES:**

**GM PERFORMANCE PARTS**

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[www.gmperformanceparts.com](http://www.gmperformanceparts.com)

**GM PERFORMANCE DIVISION**

[www.gmperformancedivision.com](http://www.gmperformancedivision.com)



Here, Darren is working on the headers, but it gives you a nice look at the front suspension. The completed system offers all of the benefits of a modern Corvette. GMPD added coilover shocks from PDAF for the C6 suspension. You can also see the additional front support that the team built to add structural integrity to the front of the car. It connects the cowl on three surfaces to the radiator support, while adding an additional body mount.